SUPPORT FOR THE AMENDMENT

Claims 1-20 will be active upon entry of this amendment.

Support for the amendment to claims 1-2 is found in the specification on page 10, lines 16-18.

Support for the new claim 8-12 is found in the specification on page 4, lines 5-16.

Support for the new claims 13-18 is found in the specification on page 6, lines 5-24, through page 7, lines 1-3.

Support for the new claims 19-20 is found in the specification on page 7, lines 4-16.

No new matter would be added to this application by entry of this amendment.

REQUEST FOR RECONSIDERATION

The claimed invention is directed to a process for producing a vinyl chloride-based polymer which comprises adding an aqueous solution of an ethylene oxide/propylene oxide copolymeric polyether with a weight average molecular weight of 1,500,000 to 2,000,000, and an ethylene oxide to propylene oxide molar ratio within a range from 78/22 to 82/18, as an antifoaming agent, in a quantity equivalent to 0.001 parts by weight to 0.008 parts by weight, to a polymerization mixture.

Polyvinyl chloride is a widely-used plastic and is a valuable product in the chemical industry in terms of revenues generated. Methods to improve production by reducing the polymerization time of vinyl chloride are being developed. One such method is based on cooling the polymerization reaction by employing a polymerization vessel jacket and a reflux condenser. However, in some instances of vinyl chloride-based polymer production by polymerization reaction in an aqueous medium accompanied by cooling, foaming of the polymerization reaction liquid may occur. Foaming of the reaction medium can cause a deterioration of quality of the resulting polymer. Specifically, it may be difficult to obtain a

polymer of uniform quality with a desired particle size distribution, porosity, bulk specific gravity and volume resistivity. Severe foaming of the polymerization reaction liquid may result in an increased number of fish eyes and foreign matter within the polymer. Accordingly, improved methods of producing polyvinyl chloride are sought.

The claimed invention addresses this problem by describing a process employing an antifoaming agent for suppressing foaming of the polymerization reaction liquid and producing a vinyl chloride-based polymer of high quality.

Such a process is nowhere disclosed or suggested in the prior art of record.

The rejection of claims 1-7 under 35 U.S.C. 103(a) in view of Kawakubo et al. U.S. Patent No. 6,022,908 is respectfully traversed.

Kawakubo describes a process characterized by adding an antifoaming agent, additive (A), and a partially saponified polyvinyl alcohol, additive (B), to suppress foaming of the polymerization reaction liquid (abstract). Kawakubo describes a silicone-based antifoaming agent as being preferred over the polyalkylene glycol-based antifoaming agents, such as polyoxyethylene, polypropylene oxide copolymers (page 2, [0026-0027]). The addition of an ethylene oxide/propylene oxide copolymeric polyether with a weight average molecular weight of 1,500,000 to 2,000,000, and an ethylene oxide to propylene oxide molar ratio within a range from 78/22 to 82/18, as an antifoaming agent, in a quantity equivalent to 0.001 parts by weight to 0.008 parts by weight, to a polymerization mixture is nowhere described in Kawakubo.

Further, Kawakubo exemplifies the addition of a silicon-based antifoaming agent, additive (A), containing dimethylpolysiloxane, to suppress foaming of the polymerization reaction liquid (page 3, [0044-0046] and page 4, Table 1, Examples 1 and 2). Kawakubo describes the silicon-based antifoaming agent, additive (A), as exhibiting suitable antifoaming effect in a polymerization reaction (page 5, Table 3, Examples 1 and 2).

However, nowhere in the reference is there exemplified or evaluated the use of the less preferred polyalkylene glycol-based antifoaming agents, such as polyoxyethylene, polypropylene oxide copolymers.

In contrast, the claimed invention recites an ethylene/propylene oxide copolymeric polyether, with a weight average molecular weight of 1,500,000 to 2,000,000, and an ethylene oxide to propylene oxide molar ratio within the range of 78/22 to 82/18, as an antifoaming agent, in a quantity equivalent to 0.001 parts by weight to 0.008 parts by weight.

As a polyoxyethylene polypropylene oxide copolymer is less preferred there is no motivation to have selected an ethylene oxide/propylene oxide copolymer as claimed. Moreover, Applicants demonstrate unexpected antifoaming results using the claimed antifoaming agent. In particular, Applicants demonstrate that a high quality vinyl chloride-based polymer is obtained. As evidence, the Examiner's attention is directed to Table 1 on page 13 of the specification.

As shown in Comparative Example 2 in the table below, using an ethylene oxide/propylene oxide copolymeric polyether with an weight average molecular weight of 4,000, below that claimed, as an antifoaming agent, the vinyl chloride-based polymer is obtained with a reduced volume resistivity of 1×10^{13} $\Omega \cdot cm$ (page 13, Table 1).

Ethylene oxide/propylene oxide copolymeric polyether	Example 1 Invention	Comparative Example 1	Comparative Example 2	Comparative Example 3
Weight average molecular weight	1,500,000	None added	4,000	4,000
Quantity added (parts by weight/vinyl chloride monomer parts by weight)	0.005	-	0.005	0.02
Ethylene oxide/propylene oxide (mol%/mol%)	80/20	-	85/15	85/15
Properties of the vinyl chloride-based polymer:				
Bulk specific gravity (g/ml)	0.524	0.519	0.545	0.555
Volume resistivity ($\Omega \cdot cm$)	4×10^{13}	4×10^{13}	1×10^{13}	3×10^{12}

In contrast, a vinyl chloride-based polymer with higher volume resistivity (4×10^{13} $\Omega \cdot$cm) is obtained using the claimed ethylene oxide/propylene oxide copolymeric polyether with the weight average molecular weight of 1,500,000, as an antifoaming agent (Example 1, table above).

Notably, a further decrease in volume resistivity (3×10^{12} $\Omega \cdot$cm) of the product polymer is observed when the quantity of ethylene oxide/propylene oxide copolymeric polyether, as an antifoaming agent, is increased to 0.02 parts by weight, above that claimed (Comparative Example 3, table above). In contrast, Applicants demonstrate a higher volume resistivity of 4×10^{13} $\Omega \cdot$cm of the product polymer using 0.005 parts by weight of the claimed antifoaming agent (Example 1, table above).

In addition, in the absence of an antifoaming agent, the product polymer is obtained with a reduced bulk specific gravity of 0.519 g/ml (Comparative Example 1, table above).

In summary, the claimed process, which comprises adding the claimed antifoaming agent, produces a vinyl chloride-based polymer with both higher volume resistivity (4×10^{13} $\Omega \cdot$cm) and specific bulk density (0.524 g/ml) (Example 1, table above).

Thus, the overall improvement in quality of a vinyl chloride-based polymer is obtained using an ethylene oxide/propylene oxide copolymeric polyether with a weight average molecular weight of 1,500,000 to 2,000,000, at an ethylene oxide to propylene oxide molar ratio within the range of 78/22 to 82/18, as an antifoaming agent, in a quantity equivalent to 0.001 parts by weight to 0.008 parts by weight, as recited in claim 1.

Based on teaching in Kawakubo, one skilled in the art would not expect sufficient antifoaming effect and, therefore, would expect a poor quality of the product polymer using the less preferred polyalkylene glycol-based antifoaming agent. Therefore, the claimed invention would not be obvious in view of the cited reference.

Accordingly, withdrawal of the rejection of claims 1-7 in view of Kawakubo under 35 U.S.C. § 103(a) is respectfully requested.

The rejection of claim 1 under 35 U.S.C. § 112, second paragraph, has been obviated by amendment.

The currently amended claim 1 now recites a polymerization conversion.

Withdrawal of the rejection of claim 1 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Applicants request allowance of this application.

Respectfully submitted,

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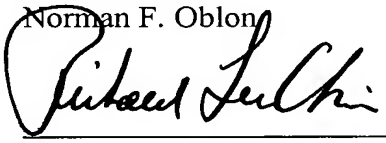
Norman F. Oblon



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